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ABSTRACT

Six environmental education simulation games are presented in this manual, developed by Project SESAME G (Susquehanna ESEA Synergetic Activities for Maximal-involvement via Education Games). The simulations are models of social situations which provide an opportunity for social interaction in the classroom, maximize student involvement, and change the roles of both teacher and student. Background information and instructions are given for each game and include an overview of the game, objectives, materials and game components, procedures, win criteria, debriefing, and a space for results of a game tryout. Additional material pertinent to the individual game is appended after each description. The games are titled: Re-Con, Forest Adventure, Camp-O-Rama, Conserv-O, and Specimens and Categories. Suggested uses are for elementary grades (4-8) and high school social studies and general science classes, although many may be adapted for several subject areas. Both role-playing and board games are covered and emphasize decision-making, awareness, identification, classification, and map reading skills. (BL)

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Environmental Education Games

- Resources in Conservation
- Forest Adventure
- Camporama
- Maporama
- Conservation
- Specimens and Categories

Pennsylvania Department of Education 1972

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Project Sesame G

PREFACE

Project SESAME (Susquehanna ESEA Synergetic Activities and Multi-innovative Experiences) is a regional complex of projects involving the public and non-public schools of Columbia, Montour, Northumberland, Snyder and Union counties in Central Pennsylvania. The principal objective of the program is to improve opportunities for pupil learning by developing a model for the coordination of smaller school districts' innovative ventures and by stimulating professional staff.

SESAME G (Susquehanna ESEA Synergetic Activities for Maximal-involvement via Educational Games) is one of the many undertakings of the program. Six environmental simulation games were selected from the numbers of games developed by the project staff whose functions emanate from Region L, Educational Development Center, Department of Education, Bucknell University, Lewisburg.

Educational games designed for classroom use have been labeled simulation, games with simulated environments, simulation games and simply games. The lack of agreement arises from the great number of uses of this relatively new educational innovation and partly by the nature of the tool itself. However, individual teachers have long used games or game-like devices to arouse student interest and to dramatize materials.

What is new about simulation games is the combination of the technique of gaming with that of simulation. A simulation is a selective representation of reality, containing only those elements of reality that the designer deems relevant to his purpose. Simulations are operating models of physical or social situations. The six environmental education simulation found herein are models of social situations.

Simulation games seem not only to involve students and absorb their interest in the learning process but also help them learn better than other traditional methods.

Games stimulate the process of problem solving, provide an opportunity for social interaction in the classroom, maximize student involvement and change the roles of both teacher and student. Learning is made exciting and relevant especially in the role-playing components of social situations in which students learn to understand and adapt to the social institutions and processes which affect them as adults.

As simulation games mix cooperation and competition within the classroom, it is hoped that the attitudes, behaviors and concerns for the environment are established for adulthood and community.

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RE-CON

I. Overview.

A role-playing game for use in a high school social studies class, RE-CON involves the making of decisions that affect resources and conservation in a small mining town. It is a game in which the whole class can participate.

RE-CON is designed to illustrate a conflict. Other conflict situations can fit into the same general format.

II. Objectives.

A. Behavioral.

1. After playing the game once, and using no reference materials, the student should be able to list at least three facters involved in conservation. Possible factors include:
    a. clean streams
    b. car exhaust
    c. fertilizers
    d. clean air
    e. wildlife protection
    f. highway beautification
    g. rural sewers
    h. state game studies
    i. reforestation
    j. city planning
2. The student should be able to list at least two ways in which development of natural resources could hinder conservation. (One eviden in the game is: pollution of air and streams by an industry using coal.)
3. Given a list of possible interest groups in a community
    a. Townspeople
    b. President of a Union
    c. Mayor (or council)
    d. Local Game Warden
    e. Doctor

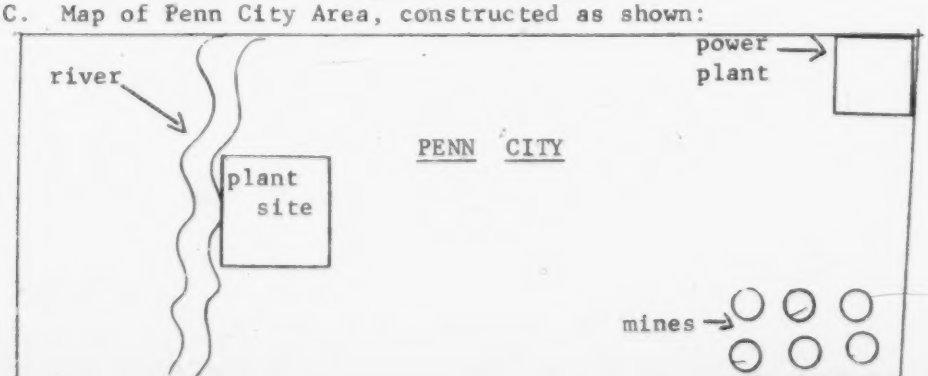
    the student should be able to rearrange the list in order of influence.

B. General.

1. The student should gain an understanding of the interaction of forces within a community during a time of decision-making.
2. The student should learn to work together, making compromises, to arrive at solutions that will be beneficial to as many groups as possible.

III. Materials and Game Components.

A. Scenario for all participants (see Appendix A).
B. Roles for all participants (see Appendix B).
C. Map of Penn City Area, constructed as shown:



D. Voting sheet for all participants. (See Appendix C.)

IV. Procedures.

A. Period #1 (3 minutes): Students read their scenarios and their individual roles.
B. Period #2 (15 minutes): Townspeople and role-players interact in 3 minute intervals. Each role-player moves with his group to another location at the end of each interval, while the townspeople remain stationary at different locations within the classroom.
C. Period #3 (time arbitrary). The Mayor conducts a town meeting and all participants in the game are given a chance to speak.
D. Period #4 (3 minutes): Each role-player, including the Mayor, votes for a company. (Company presidents do not vote.) The Mayor tabulates the votes for the companies by asking each group or individual which company he favors.

V. Win Criteria.

A. The president whose company receives the most votes wins the game.
B. Game participants win the game if they vote for the winning company.

VI. Debriefing.

A. The following questions may be appropriate:
   1. Which pressure groups had the most influence in the community?
   2. What was the most important resource in question during the game?
   3. Did the Mine Workers Union favor conservation? Why?
B. Test according to the behavioral objectives.

VII. Results of Tryout.

Appendix A

Scenario

Penn City is a depressed coal mining community that badly needs new industry. Two companies are interested in locating in the area, but both want the same favorable location along the river and will accept no other. The American Nylon Company will employ 100 local workers and will use coal in its operations. The American Laser Company will employ 50 local residents but has great potential for expansion in the immediate future. It uses electricity produced by a power plant in another community in its operations and will make no use of coal. Penn Township has good natural resources to offer industry. It has coal, electricity, and a clean river; the American Nylon Company, however, will be forced to dump waste chemicals into the river and has no means to prevent pollution of the air from its smoke stacks. The people of the community are asking themselves, "Which industry will be best for our community?"

Appendix B

Roles and Power

Fisherman

You are Marlin Troutman. Fishing is your most enjoyable pastime, but you are an unemployed miner. You have a son in college and expenses are piling up. You are undecided at this time.

Voting Power - 1 Point

President of Medical Association

You are Dr. Jonas Casey. You want to keep the community healthy, but you realize there is a need for employment. You want to hear both sides.

Voting Power - 2 Points

President of the American Nylon Corporation

Your name is Joe Smith. Your industry offers only immediate employment for the area. Mining will also be stimulated in the community by your use of coal. However, you cannot avoid the pollution of the Shamcarm River and the clean air of the Penn community. You must convince the other game participants that your industry is best for Penn Township. You will win the game if you convince the game participants that they should have your industry in their community.

Mine Owner

You are Henry Dominant, owner of the Penn Valley Mine. You desire to get your mine back to full-time production. You are well known in the community and proud of the contributions you have made to its growth. You are not too popular with your mine workers.

Voting Power - 5 Points

Townspeople

You are an undecided resident of the community. You want what is best for your town. You are aware of its problems concerning unemployment. Decide which industry will be best for your town after hearing all arguments.

Voting Power - 1 Point

Forest Ranger

You are Ken Woods, the conscientious local forest ranger. Your best allies in your job have been the local sportsmen and the few area farmers. You are sympathetic with the area's economic problems but want to do your job well.

Voting Power - 2 Points

President of the American Laser Company

Your name is "Rip" Lighting. You will bring a "clean" industry into the area and use electric power. Although you will employ only 50 workers initially, your company has great possibilities for expansion. You must convince the game participants that your industry is best for the Penn community. You will win the game if the participants vote for your company.

Game Warden

You are Vincent Stalker. You are interested in conserving wildlife and keeping clean streams. You see possibilities in visiting hunters and fishermen adding to the local economy.

Voting Power - 2 Points

President of the Rotary Club

You are Rudy Wheeler, a local store owner. Members of the Rotary Club to which you belong are mainly local businessmen. You feel that the local economy needs immediate help. You want to see as many unemployed men as possible in your community get back to work as soon as possible.

Voting Power - 5 Points

Women's Civic Club President

You are Mrs. Scout. Your husband is an unemployed mine foreman. You like the mining industry and feel that it can make a comeback. Many of your personal friends are connected with the mining industry. You want your club and the community to favor the American Nylon Company.

Voting Power - 5 Points

President of the Mine Workers Union

You are John L. Coalhead. The American Nylon Company will use coal in its operations and thereby help employment in the local mines. Thus, you favor the Nylon Company.

Voting Power - 8 Points

President of Local Sportsman Association

You are Fred Firearm. You feel that the community needs industry, but not at the expense of recreation. However, you want to hear both sides of any argument. You are a lineman for the local power company.

Voting Power - 5 Points

The Mayor

You are George Plunkett, the popular mayor of the city. You will conduct the town meeting and discussion of the possibility of a new industry coming to town. You are torn between your desire to maintain your political popularity and your own firm opinions on what is best for your community.

Voting Power - 10 Points

Water Company Official

You are Rocky Rivers. You want to keep the Shamcarm River clean because your company's water comes from the river. The people must know that pollution threatens the drinking water of the community.

Voting Power - 2 Points

Appendix C

VOTING SHEET

PLAYER	Predicted Vote on Company			Actual Vote on Company	
	ANC	ALC		ANC	ALC
George Plunkett, Mayor					
Rudy Wheeler, Rotary Club					
Vincent Stalker, Game Warden					
Mrs. V. Stout, Civic Club President					
Rocky Rivers, Water Co.					
Marlin Troutman, Fisherman					
Dr. Jonas Casey, Local A.M.A.					
John Coalhead, Miner's Union Association					
Fred Firearm, President Sportsman Association					
Ken Woods, Forest Ranger					
Townspeople (what majority will vote)					
Harry Dominant (mine owner)					

FOREST ADVENTURE

I. Overview.

A teaching game designed for grades four to eight, FOREST ADVENTURE helps students recognize the value of our natural resources, acquaints them with the interdependence of forest regions, and teaches facts about the propagation and commercial user of trees. Groups of five students or five teams of students can play.

The game can be adapted for social studies, science, and industrial art.

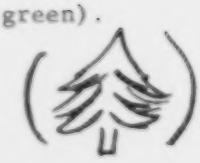
II. Objectives.

A. Behavioral.
1. The child should be able to list the five forest regions of the United States. In addition, he should be able to name one tree from each region. Extra credit can be given if he names more than one tree. (This information is provided in Appendix A on the map used to play the game.)
2. The child should be able to list at least five commercial uses of trees. Extra credit can be given if he names the particular tree which supplies the product. (This information is also listed on the map.)
3. Given a list of eight sentences which describe ways in which a tree can or can not be propagated, the student should be able to select the four major ways in which a tree can be propagated.
4. The child should be able to write at least three factors that prevent a tree from growing. (These are listed in section IV, B, 2, d, and include fire, insects, and disease.)

B. General.
1. The child should be more aware of the many commercial uses and by-products of trees.
2. The child should be able to synthesize information by learning to use a map containing the five forest regions.

III. Materials and Game Components.

A. Needed Materials.
1. Eight sheets of white poster board (22" X 28").
2. Four felt-tip markers (green, blue, red, yellow).
3. Three nails.
4. One pencil cut into ½" sections. Remove lead from center.
5. Masking tape.
6. Five cubical counting blocks (red, yellow, orange, blue, green).
7. Three wooden disks approximately 5" in diameter.
8. Elmer's Glue-All.
9. Five small 3" trees made of green construction paper.
10. Five toothpicks.
11. Approximately 50 index cards.
12. Optional- three paper plates which resemble wood grain, used only for decoration on disks.



B. Construction of Game Components.

1. Map:

a. Tape together two sheets of white poster board. On the opposite side, trace or draw a map of the United States. (A map can be projected onto the poster board and traced.) Insert the five forest regions of the United States by outlining, coloring, and labeling them (see the accompanying map).

(1) West Coast Forest (Redwood).
(2) Western Forest (Ponderosa Pine and Fir).
(3) Central Hardwood Forest (Walnut, Maple, Oak, Cherry, Poplar, Birch).
(4) Southern Forest (Pine, Cedar , Mahogany).
(5) Northern Forest (Maple, Pine, Spruce).

b. Add to the map significant data such as the by-products of trees (see accompanying map).

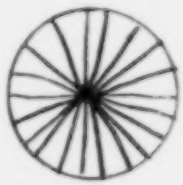
c. Add related information such as, "How Trees are Started" (see accompanying map).

d. Add the five forest trails (West Coast Forest Trail, Western Forest Trail, Central Hardwood Forest Trail, Southern Forest Trail, and Northern Forest Trail). Begin trails near lower section of the map. Section each trail into 25 spaces.

2. Spinning Disks:

a. Cut six disks, 16" in diameter, from heavy white poster board.

b. Divide three of the disks into 20 equal sections (see illustration).



c. On one of these disks, write the following 20 sentences or phrases. (some phrases describe how a seedling propagates, and other phrases state various obstacles which the seedling encounters in becoming a tree.)

(1) River carries you. 5 ahead.
(2) Mountain peak ahead. Stop.
(3) Squirrel carries you. 1 ahead.
(4) Rain. Stop and take cover.
(5) Wind in the right direction. 5 ahead.
(6) Snow storm. Stop.
(7) Sunny day with breeze. 12 ahead.
(8) Thunder shower. Stop.
(9) You are carried in stream. 13 ahead.
(10) Forest fire ahead. Stay where you are.
(11) Animal carries you. 2 ahead.
(12) Hurricane. Stop and hide.
(13) Bird carries you. 3 ahead.
(14) No breeze. Stay where you are.
(15) Person carries you. 3 ahead.
(16) Squirrel attacks. You land in his nest. Stop.
(17) Very windy. 13 ahead.
(18) Heavy winds. Go back home.
(19) Helicopter makes breeze. 2 ahead.
(20) Tornado whirls you back home.

d. On the second disk, write the following 20 sentences or phrases: (fifteen phrases or sentences are factors which prevent the tree from growing or stunt its growth; the other five merely state, "You are a full grown tree.")

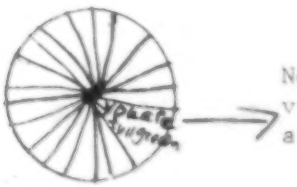
(1) You are a full grown tree.
(2) Beetles attack. Your growth is stunted.
(3) Trumpet vine chokes you.
(4) Tent caterpillar strips some of your leaves.
(5) You are a full grown tree.
(6) You are gnawed by a beaver.
(7) Poison ivy almost chokes you to death.
(8) You are being trimmed by forest rangers.
(9) You are a full grown tree.
(10) Lightning strikes you.
(11) You have been gnawed by a deer.
(12) You are attacked by blight. Ranger comes to your rescue.
(13) You are a full grown tree.
(14) Fungi enter your bark. You require surgery.
(15) Heavy wind tears your bark. You require aid.
(16) There's too much rain. You can't survive unless it stops.
(17) You are a full grown tree.
(18) You are weak. Cavity in your heartwood. Sorry, no heart transplant.
(19) Forest fire. You are scorched.
(20) Extreme temperature. You can't grow.

e. On the third disk, write the following 20 sentences or phrases: (some of these sentences deal with the commercial uses of trees, while others are not related to forest industry).

(1) The boat builder needs you for some wood.
(2) You are needed for a metal screen door.
(3) The veneer company wants you for plywood.
(4) You are needed to make a glass ash tray.
(5) You are needed to make headlights on a car.
(6) The painter needs you for turpentine.
(7) You are needed for pavement on highways.
(8) You are needed for paper.
(9) Your lumber is needed for homes.
(10) The shoe industry needs you for shoe strings.
(11) The plastics industry needs you to make nylon combs.
(12) You are needed for a light bulb.
(13) You are needed to make china.
(14) You are needed for maple syrup on pancakes.
(15) You are needed for iron railings for the front porch.
(16) Your oranges are needed to make orange juice.
(17) You are needed as a cement block for building.
(18) The copper industry wants to make a pipe from you.
(19) The painter needs you for wood alcohol.
(20) The aluminum industry needs you for roofing.

f. Glue each of these three phrase disks onto a separate wooden disk.

g. Decorate the three remaining paper disks with sketches of leaves. (The wood grain paper plates may also be used.) Nail each of the decorated disks onto a phrase disk, inserting the ½" section of pencil between each disk (this will permit the top disk to rotate freely). Cut out a section ($\frac{1}{20}$) from the top of each spinning disk so that only one phrase on the lower disk is clearly visible (see illustration).



Note: Phrase is clearly visible when top disk is attached.

h. Label each top disk #1, 2, or 3 respectively: disk #1= obstacles encountered by seedling, disk #2= factors which prevent growth of tree, disk #3= commercial uses of trees.

3. Wooden cubes: (Representing seedlings).
   a. Saw the five cubical counting blocks into four equal sections (they will resemble sugar cubes).
   b. To a red, green, yellow, blue, and orange cube, attach a small tree. Use toothpicks to support the

4. Commercial Use Card:
   a. On each index card, print or write the commerc of a tree found on disk #3. For example: plywood, turpentine, orange juice, maple syrup, lumber for homes, plastics, wood alcohol, boat building, roofing materials, etc. (Make three copies of each card.)

IV. Procedures.

A. Five children or five teams can participate in the game. A forest region on the map is assigned to each child. Each child is also given a wooden cube (representing a seedling), which is the same color as his forest region, and a miniature tree, which is mounted on a cube. He places the seedling (cube) on the trail that leads to his forest region.

B. To begin, one player rotates disk #1. The visible phrase indicates whether he can move his seedling toward his forest region. Each child takes his turn with disk #1 until he reaches his forest region.

C. When a child reaches this region, he takes his turn by rotating disk #2 until he lands on the phrase, "You are a full grown tree." When this occurs, he replaces his seedling with a miniature tree.

D. The next time he takes his turn, the player rotates disk #3 and attempts to recognize a commercial use of a tree. If he can recognize a commercial use of a tree, and then correctly name the region from which this by-product is obtained, he is given a

Commercial Use Card on which is written the particular by-product which he has just named. (It is possible that some of the players may be rotating disk #3, while others may be rotating disks #1 or #2.)

V. Win Criteria.

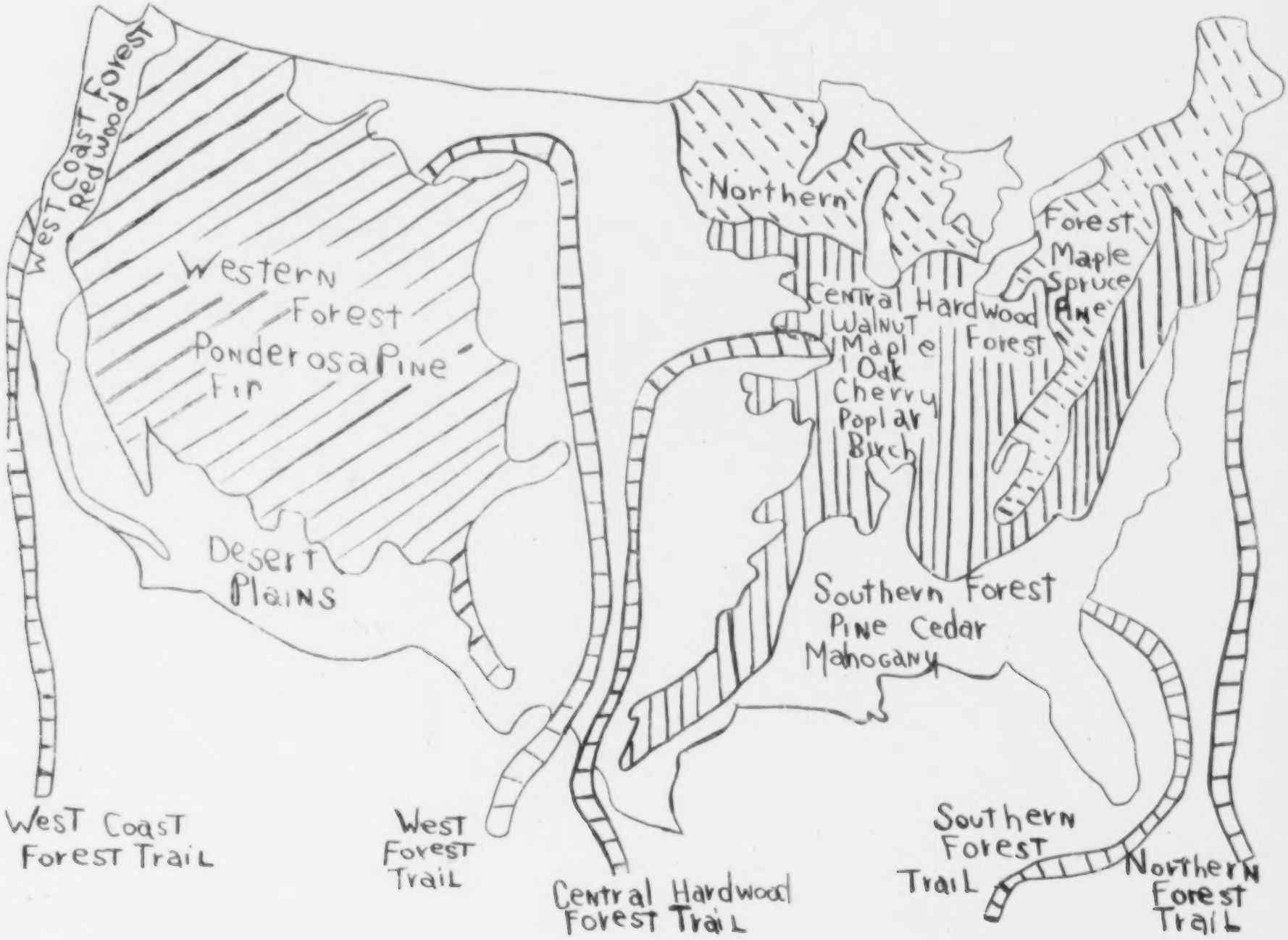
The first child to receive two Commercial Use Cards is the winner.

VI. Debriefing.

A. The following questions may be appropriate:

1. To the winner.
   a. Why do you think you won the game?
   b. Why do you think your seedling became a tree faster than other seedlings?
   c. What can you do to help seedlings survive?
   d. Tell us the two commercial uses which you have listed on your cards. How did the forest provide jobs for people who helped make those products?
2. To the losers.
   a. What delayed the growth of your seedling?
   b. In real life, is there any way that you could help the seedling grow?
   c. Are there obstacles which your seedling encountered which you couldn't control, even if you tried? If so, which ones? (Climatic factors)
   d. Did you get an opportunity to rotate disk #2? If so, what prevented your tree from maturing into a full grown tree?
3. To the entire group.
   a. With what raw materials do our forests provide us?
   b. Why is it so important for us to plant new trees to take the place of those that are cut?
   c. What will a good citizen do to help prevent forest fires?
   d. Why do you think each forest region has a certain type of tree growing there? (Climate)
   e. Can you name the two types of trees? (Deciduous and Evergreen)
   f. What types of machinery do you think are needed in lumbering operations?
   g. Why do we depend on forests?

VII. Results of Tryout.


West Coast Redwood Forest
Western Forest
Ponderosa Pine
Fir
Desert Plains
Northern
Forest
Maple
Spruce
Pine
Central Hardwood Forest
Walnut
Maple
Oak
Cherry
Poplar
Birch
Southern Forest
Pine Cedar
Mahogany
West Coast Forest Trail
West Forest Trail
Central Hardwood Forest Trail
Southern Forest Trail
Northern Forest Trail

Appendix B

Facts Which Can Be Included on Game Board

Forest products:

1. plywood and veneer
2. paper
3. rayon
4. plastics
5. wallboard
6. molasses
7. sawdust fuel
8. lumber
9. chemicals
10. turpentine
11. alcohol
12. insecticide
13. drying agents
14. poisons
15. food

How trees are started:

Nature:

1. Seeds drop to the ground.
2. Sprouts grow from tree stumps.

Man:

1. Plants seedlings by hand.
2. Plants seedlings by machine.
3. Plants seed by helicopter.

CAMP-A-RAMA

I. Overview.

A teaching game designed for the elementary grades, Camp-A-Rama will help the student make decisions to overcome the unforseeable situations that may arise during a camping adventure. Pupils may also learn the advantage of sharing. This game may be played by two to six players, or groups of players, from grades 3 to 6.

II. Objectives.

A. Behavioral.

1. The student will be able to distinguish various types of camping equipment used on a camping trip.
2. The student will be able to select proper equipment to be able to survive the unforseeable situations that arise during a camping trip.
3. The child should be able to choose a path that will enable him to reach his goal with least difficulty.
4. The child will be able to compare the effectiveness of cooperative versus individual strategy.

B. General.

1. The child should be more aware of the many unforseeable situations and hazards encountered during a camping trip.
2. The children should be able to make decisions more effectively.

III. Materials and Game Components.

A. Needed Materials.

1. Two sheets of white poster board (22" x 28").
2. Three felt-tip markers (red, blue, green).
3. Masking tape.
4. Elmer's Glue-All.
5. Optional --- various colored felt-tip markers to make camping scenes on board.
6. Six pace markers.
7. One set "Instant Insanity".
8. Magazine or catalogue pictures to put on equipment cards (Sears -- S & H Green Stamp).
9. Seven envelopes for each set of cards.

IV. Construction of Game Components:

1. Board.

a. Tape together white poster board. Draw the designated paths as illustrated (see Appendix A).

b. Add a cave at each intersection.

c. Color the blocks red, blue, or green on each path as indicated. Leave blank spaces white.

2. Equipment Cards.

a. Cut 54 index cards in half.

b. Label each card to correspond with the following list. Cut pictures from magazines or catalogues to correspond with the label.

1. Tent.
2. Radio.
3. Matches.
4. Flashlight.
5. Baseball.
6. Rope.
7. Can Opener.
8. Sleeping Bag.
9. First-aid Kit.
10. Canteen full of water.
11. Hatchet.
12. Mess Kit.
13. Compass.
14. Knife.
15. Food.
16. Food.
17. Food.
18. Food.

c. Make six sets of these cards.

3. Hazard Cards.

On individual index cards put the following:

Thunderstorm	Group
1) Keep going 5 spaces and use all matches to light fire or 2) Go back to nearest cave or 3) Go home.	

Equipment	Individual
You dropped one item in the creek.	

Flashlight	Individual
1) Use flashlight to go through dark tunnel and move 6 spaces and batteries are used or 2) Move slowly 3 spaces and creep through the dark tunnel.	

First Aid Kit	Individual
You scratch your ankle on a twig 1) Use first aid kit to move 2 spaces or 2) Stay where you are or 3) If you have a partner he helps you advance 1 space or 4) If you have 1st aid kit and partner, you advance 3 spaces.	

Time to eat — Group

1) With a food card you will have enough energy to move 6 spaces

or

2) Relax.

Knife — Individual

1) Go home and get your knife which you may need later to cut through the briars

or

2) Stay where you are

or

3) If you have a knife you may move 2 spaces.

Individual

You feel like running.

Run ahead 4 spaces.

Compass — Individual

You are lost in thick bushes.

1) Wait for 1 turn as you climb a tree

or

2) Use your compass and move 2 spaces.

First Aid Kit — Individual

1) You just got stung by a bee - With first aid kit you can move to next color

or

2) Lose one turn.

Hatchet — Individual

1) Chop tree limbs and climb over to next color block

or

2) Miss 1 turn while going around fallen tree.

Rope — Individual

1) Use rope to help you over the swamp and leave it behind

or

2) Go around the swamp and miss next turn.

Equipment — Individual

1) Climb mountain. Leave behind 2 pieces of equipment and move 2 spaces

or

2) Skip 2 turns while you go around the mountain.

Food — Individual

1) You found some wild strawberries along the path. You may take 1 extra food card

or

2) You can run ahead 5 spaces

Individual

A Bear ahead --

1) Go back to nearest cross-path and change direction

or

2) Miss two turns and wait for bear to move.

Time to eat — Group

1) Turn in food card to move 6 spaces

or

2) Stay where you are.

Group

Blanket of fog --

1) Use compass to move to next color

or

2) With no compass wait 2 turns till fog lifts.

Nightfall — Group

Pitch tent or go back to nearest cave or go back home.

Knife — Individual

1) Use knife to cut through briars

or

2) Miss next turn to go around briar patch.

Mess Kit — Individual

1) Go home and get your mess kit which you may need later to cook a meal

or

2) Stay where you are

or

3) If you have a mess kit move 2 spaces.

Food — Individual

1) Stop for a meal. Use 1 food card

or

2) Search for food and miss one turn.

Food — Individual

1) Stop for a meal. Use one food card

or

2) Search for food and miss one turn.

Food — Individual

1) Stop for a meal. Use one food card

or

2) Miss next turn while searching for food.

Canteen — Individual

If your canteen is empty you may fill it at the spring.

Canteen — Individual

The sun is hot.

1) Drink a little water and rest

or

2) Drink all the water in canteen and go 6 spaces

or

3) Go back to the nearest blue block to a spring.

4. Campsite Events.

   a. Cut index cards in half. Print the following on each card:

      1. Weiner Roast

         Double Value

         Knife

         Matches

         First Aid Kit

      2. Tug of War

         Double Value

         Rope

         Canteen

      3. Overnight Trip

         Triple Value

         Tent

         Sleeping Bag

      4. Overnight Trip

         Double Value

         Sleeping Bag

         Mess Kit

V. Procedure.

1. Any number of children may participate in the game. If there are more than six players, group playing is recommended.
2. Each player receives a packet of cards. He selects any 6 cards and returns other cards to packet and puts aside. Selected cards are laid face up in front of player.
3. Player decides path he will follow.
   a. He may choose same path as another player if he so desires.
   b. As player progresses, he may follow alternative paths.
4. He rolls cube and moves to color designated by cube. If the white cube face is on the top, he must take a hazard card. Hazards will be read aloud and are for either all players or individual player, as designated on the card.
5. When 2 players are within 10 spaces of each other they may join forces.
   a. They must then stay within 10 spaces of each other at all times.
   b. They may share all equipment except sleeping bag and food.
   c. The player in the lead must wait at entrance of camp for his teammate.
   d. Either player may decide to go alone at any time and end the partnership, except when he is at the entrance to the campsite.

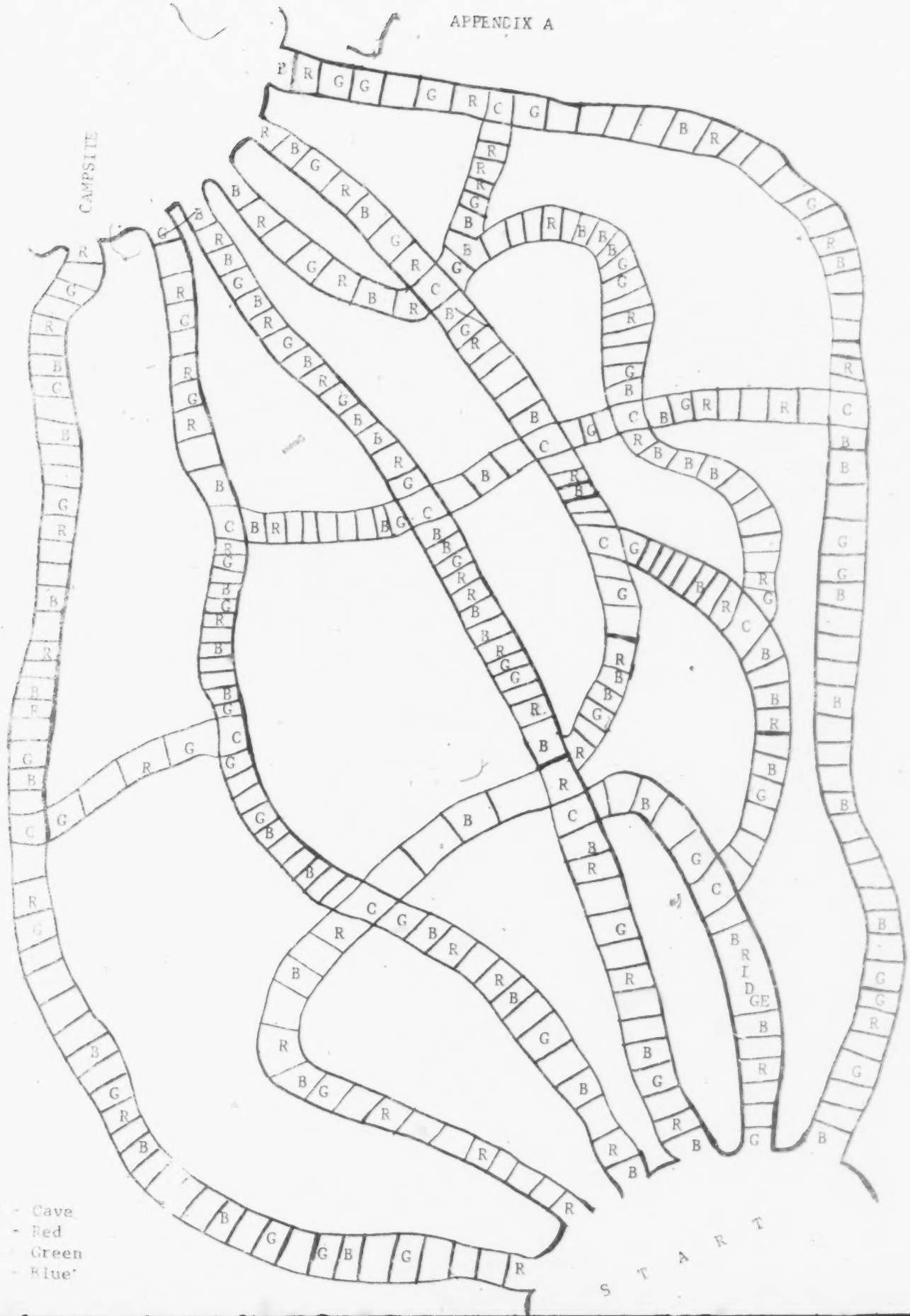
VI. Win Criteria.

The first person to arrive at campsite receives 6 points. Second receives 5 points; third, 4 points; etc.

After all players have arrived at campsite, a card is then selected from the campsite events (by the first to arrive at the camp) to determine point value of each remaining piece of equipment. The equipment not mentioned in the "campsite event" will receive 1 point.

The child with the largest total is the winner.

APPENDIX A



MAP-O-RAMA

I. Overview.

This board game was designed to teach map reading skills (population, natural resources, political, products, geographic relief, and precipitation maps) to children in grades five through seven. Six to 36 players can play at one time; players play in teams.

This same format can be used with sets of historical maps from United States or world history classes or with other types of geographical maps.

II. Objectives.

A. Behavioral.
In this game, the following types of maps concerning the United States are used: political, graphic relief, precipitation, population, products, and natural resources. Corresponding to each map is a set of six questions the answers to which appear on the map. (See Section III, B, 3 sample.) Given the six maps, the student should be able to demonstrate his map reading skill by answering 30 of the 36 possible questions.

B. General.
It is hoped that through playing a game in teams, the class members will learn to to interact and cooperate successfully with one another.

III. Materials and Game Components.

A. Needed Materials.
1. 36 3" X 5" index cards (or one card per question).
2. Four large pieces of poster board.
3. A wooden cube, ½" square on each side.

B. Construction of Game Components.
1. A large map of the United States mounted on poster board or on a bulletin board can serve as the game board. Across this map from the East Coast to the West Coast extends a six lane highway on which the players make their moves. Each lane of the highway is divided into 25 equal segments or moves. Strings attached at both ends of the highway serve as "tracks" along which cardboard or plastic model cars can move.
2. A set of six maps for each student including:
   a. Political Map
   b. Precipitation Map
   c. Products Map
   d. Population Map
   e. Graphic Relief Map
   f. Natural Resources Map
3. 36 questions (these can be found in textbooks and reproduced on a Thermofax machine), or as many as desired, which can be answered using the above maps, printed on 3" X 5" index cards. Teachers may use questions of their own choice. Below are some sample questions.

I. Population Map.
   A. Which parts of the United States are most heavily populated?
   B. Which state has the fewest people in it?
   C. Name three states in the least populated area of the United States?
   D. Is the state you live in sparsely or heavily populated? Justify your answer.
   E. Name the three cities in the United States which have the most people living in them.
   F. Which state in the Rocky Mountain Area is the most heavily settled?

II. Natural Resources Map.
   A. Where are the largest deposits of anthracite coal found?
   B. Name three states in which salt is mined.
   C. In which part of the country is the most oil found?
   D. Bauxite is used to make aluminum. Where in the United States is a bauxite mine located?
   E. Some people make their livings from the sea. What kinds of fish are netted off our Pacific Coast?
   F. Fertile soil is a great resource. Where is our country's largest farming region?

III. Political Map.
   A. Which state borders Texas on the west?
   B. What four states border Lake Michigan?
   C. What state is in the southern most part of the United States?
   D. What is the capital of Virginia?
   E. What is the name of the river separating Pennsylvania and New Jersey?
   F. Which state on the Pacific coast has the longest coastline?

IV. Products Map.
   A. This map could be made with pictures glued on cards; the designers of the game used pictures of:
      1. Wheat
      2. Oranges
      3. Potatoes
      4. Lumber
      5. Corn

   Questions involving these products could then be written.

V. Graphic Relief Map.
   A. Which lakes in the Northern United States were created by glaciers digging out great depressions?
   B. Which long river system drains the interior part of the United States?
   C. When streams or rivers flow into valleys surrounded by mountains, they form lakes. Name a lake formed in this manner.
   D. Are any mountains in the East over 10,000 feet in elevation? If so, which ones?
   E. Weathering wears away mountains and makes them smaller. Which mountain chain on the mainland of the United States is the oldest?
   F. Which valley in the continental United States is the lowest?

VI. Precipitation Map.
   A. Moisture may fall in the form of rain, snow, sleet or hail.

How much moisture falls per year in the northern-most part of the United States?

B. In the Southwest are many deserts, what color indicates this dry land?

C. Trees need 30 inches of rainfall a year. What areas in the United States do not contain many trees for this reason?

D. Cotton needs 23 inches of rainfall a year to grow well. Is the Southeastern United States the only part of our country that has this much rainfall?

E. Portland, Oregon, is in the Northwestern part of the United States. What is its average annual rainfall?

F. What is the average annual rainfall in the Midwestern wheat-growing region of our country?

4. A wooden cube, ½" on each side, with 100, 200, and 300 printed on its six sides. This cube can be called a "mil-o-cube."

5. Six cardboard or plastic model cars to move on the gameboard.

IV. Procedures.

A. The class is divided into six teams, and a set of six maps is distributed to each team member.

B. A child from Team One comes to the front of the room and selects a question card from the deck. He reads the question to the class and then returns to his seat to use his maps before giving his answer. All other players also try to select the appropriate map and find the correct response. A time limit for responses can be set at the teacher's discretion.

C. If the child from Team One does not respond correctly, the first child on Team Two gets a chance to answer. This rotation among teams continues until the question is correctly answered. (The teacher rules on the accuracy of the answers.) A response is considered correct only when the appropriate map is selected and an accurate response to the question given.

D. The child who answers correctly then rolls the "mil-o-cube" to determine how many moves his team may make on the game board. Each space on the game board highway equals 100 miles, so that if the student throws "300," his team can move three spaces.

E. This process is repeated with the children on the teams taking turns until one team reaches the West Coast.

V. Win Criteria.

The team which first reaches the West Coast on the game board is declared the winner. It is suggested that the game be replayed several times.

VI. Debriefing.

A. The following questions may be appropriate.

1. What types of maps did we use in the game to provide information?
2. How might these maps be helpful to us in our study of the United States?
3. Which type of map did you find most difficult to use? Why?
4. Other questions considered appropriate by the teacher.

B. Test according to the behavioral objective.

VII. Results of Tryout.

CONSERV-O

I. Overview.

This is a board game which teaches conservation problems and practices in the United States. It shows the departments responsible for the execution of proper practices for these problems. It is a game that can involve the entire class of 4th, 5th, or 6th graders in groups of 3 to 5.

II. Objectives.

A. Behavioral.

1. Child will identify areas of the United States where conditions are are most likely to occur.
2. Child will describe "freak" conditions of nature which occur in various parts of the country.
3. Identify government departments concerned with conservation practices.
4. On a written test the child will successfully list ten conservation problems and their appropriate solutions.

B. General.

Each child should be able to identify good and bad practices of conservation.

III. Materials for one group.

A. Needed materials.

1. 22" x 28" posterboard of a light color.
2. Die.
3. 8 index cards, 3" x 5".
4. 42 2½" x 3" cards.
5. Four rubber bands.
6. One black magic marker and four assorted colors of magic markers.

B. Construction of Game Components.

1. Board.

a. Make outline of U. S. (see Appendix A) on posterboard.

(1) Divide U. S. into 8 geographical regions: Northeast -- Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York. New Jersey, Pennsylvania.

North Central -- Ohio, Indiana, Michigan, Illinois, Wisconsin, Minnesota, Iowa, Missouri.

Plains -- North Dakota, South Dakota, Nebraska, Kansas.

Mountain -- Montana, Idaho, Wyoming, Utah, Colorado.

Pacific -- Washington, Oregon, Nevada, California, Alaska, Hawaii.

Southwest -- Arizona, New Mexico, Texas, Oklahoma.

Southeast -- Arkansas, Louisiana, Alabama, Mississippi, Georgia, Florida, South Carolina.

South Atlantic -- Tennessee, Kentucky, North Carolina, West Virginia, Virginia, Maryland, Delaware.

(2) With circles, triangles, etc., mark six moves per area.

b. Color coding of map.

Four colors were used: (colors choice optional)

red -- South Atlantic and Mountain regions.

purple -- Northeast and Pacific regions.

orange -- North Central and Southwest regions.

blue -- Plains and Southeast regions.

c. These colors were used to outline each region and to make the track. The corresponding conservation problem cards were also coded.

2. Conservation problem cards.

Make one problem card for each area. Place the name of the region at the top, and list the problems below on each index card, 3" x 5".

a. Mountain States.

(1) Break in dam floods valley.

(2) Soil eroded from unplanted hillsides.

(3) Department visit.

(4) Wild game reserve found on your 400 acre spread.

(5) Wild card.

(6) Ranger checks recreation area often.

b. Pacific States.

(1) Wild card.

(2) Offshore oil well leaking.

(3) Your '49 Ford has no anti-fumes device.

(4) Department visit.

(5) Mudslides cleared away by this department.

(6) Earthquakes -- heavy damage.

c. South Atlantic States.

(1) Department visit.

(2) Screening of junk yards beautifies your drive.

(3) Legislation bans billboards on interstate highways.

(4) No run-off channels to stop topsoil washout.

(5) No funds allocated for cover of open pit mines.

(6) Wild card.

3. Department cards.

On each of 6 cards, list the functions of one department, as follows.

a. Department of Mines and Minerals.

(1) Abusive strip mine practices.

(2) Off-shore oil slick.

(3) Safe drilling practices.

(4) Open pit mine abuses.

b. Bureau of Vacation and Travel.

(1) Littering -- $100.

(2) Billboards --

(3) Help protect public recreation areas.

(4) Vandaliam -- ech!

(5) Junk yards -- uglify America.

c. Department of Health.

(1) Fumes -- air pollution.

(2) Water-polluted mines.

(3) Water-pollution solved by waste disposal of sewage.

(4) Air-pollution solved by ionization of dust particles.

(5) Water-pollution from industrial waste.

d. Office of Civil and Defense Mobilization.

(1) Poor weather conditions.

(2) Earthquakes.

(3) Cracked dam -- flood.

(4) Rain and mudslides.

e. Department of Forests and Waters.

(1) Lacking trees -- flooding rivers.

(2) Forest fire prevented.

(3) Abusive timber practices.

f. Department of Agriculture.

(1) Topsoil washout in flooding.

(2) Wind erosion.

(3) Wild Game Preserve.

(4) Strip farming -- good land usage.

(5) Lack of planted fields -- soil erosion.

d. Northeastern States

(1) Ugly, unsightly strip mine not refilled.

(2) Awarded safe drilling certificate.

(3) Wild card.

(4) Strip farming done on your farm.

(5) Water polluted by mine run-off.

(6) Department visit.

e. Southeastern States.

(1) Cut off timber causes flooding rivers to wipe out crops.

(2) Wild card.

(3) Public recreation area destroyed by hailstorm.

(4) Ionization working on chemical plant controls air pollution.

(5) Department visit.

(6) Run-off channel stops.

f. North Central States.

(1) Wild card.

(2) Open Pit mine reforested.

(3) Industrial waste not allowed to be dumped.

(4) Tornado hits -- no warning -- severe weather conditions.

(5) Park table destroyed by vandalism.

(6) Department visit.

g. Plains States.

(1) Junk yards distract from scenery.

(2) Department visit.

(3) Windbreak stops wind erosion.

(4) Wild card.

(5) No warning -- severe weather conditions; 100 lose lives.

(6) No reforestation -- abusive timber practices.

h. Southwestern Western.

(1) Department visit.

(2) Billboards are everywhere; mar the scenery.

(3) No law enforcement for littering.

(4) Smokey the Bear prevented forest fire.

(5) Sewage waste disposal plant built by DuFont.

(6) Wild card.

y. Road out -- Mudslides, go back 5 spaces because of detour.

z. Rainstorm, take cover, stay where you are.

a^1. Earthquake not cleared away by office. Miss one turn to give help to local people.

b^1. Wild card -- good for any emergency.

c^1. Stop to have anti-smog device repaired on your 1969 car, stay on the same spot.

IV. Procedure and rules.

A. Four or five players are needed for the game. They shake the die from the highest to the lowest, to find the starting position on the board.

B. Each player must start in a different section of the United States from the other players.

C. The game begins by each player's shaking the die in turn. The number on the die indicates the related number on the conservation problem cards. The player must then identify the department which solves the conservation problem. He then turns the selected department card over to the back to verify his choice. (The key word in the conservation problem card must correspond with the key word on the back of the department card). If the player is correct in his department selection he proceeds the number of spaces on the die. If the player is incorrect he does not move. On the track a player is to proceed from Florida to Maine.

D. Department visit.

1. When the number on the conservation problem card indicates a department visit the player must choose one of the six departments he would like to assist.

2. He then takes the top card from the department visit card pile.

3. After reading the card the child must decide whether or not the practice stated on the card is within the jurisdiction of the department chosen by the player.

4. If upon checking with the Department Cards the player's response was was correct, he may move the number of spaces shown on the die. If his response was incorrect, he does not move at all.

E. Wild Card.

1. When the number on the conservation problem card indicates WILD CARD the player chooses the top card from the WILD CARD pile and follows the directions given on the card.

2. The WILD CARD is then returned to the bottom of that pile unless it is an emergency. Emergency may be held until needed.

V. Win Criteria.

The first person to reach the point at which they began the game via the planned route on the board.

4. Department Visit Cards

   a. The Department Visit Cards are made from the 26 practices stated on the Department Cards. Each 2½" x 3" card should contain one of these practices with no parts underlined.

   b. Also four (4) additional DVC cards should be made containing the following statement:

      You practice good conservation -- move on number of spaces shown on the die.

5. Wild Cards

   On each 2½" x 3' card, list one of the following statements.

   a. Waves good for surfing -- get your surf board -- stay one turn.

   b. Tour mines for careful inspection. Stay where you are.

   c. Heavy rainstorm causes road washout. Go back two spaces.

   d. Spend time convincing local citizens that billboards are unattractive. Go on 2 spaces.

   e. Overcrowded vacation area -- no funds available from department. Move on three (3) additional spaces.

   f. No bathing on oil slick beach for you -- go ahead 4 spaces.

   g. Ranger invites you to help plant trees. Stay where you are.

   h. Health department finds pollution free water here. Advance 2 spaces.

   i. Radio warns of dam bursting. Flee area. Move 5 spaces ahead.

   j. Miss 1 turn to give directions to a lost traveler.

   k. Bridge flooded out -- you warn children on a school bus -- go on 4 spaces.

   l. Stop to buy, write and send postcards. Stay where you are.

   m. Flood warning. Take another turn to flee area.

   n. Smokey saw you breaking branches from a sapling. Go back 3 spaces.

   o. Wild card covers any errors (emergency card).

   p. You "litterbug" -- miss 1 turn.

   q. Smokey the Bear saw you "douse" that burning match properly. Move on. Take another throw.

   r. Rivers frozen -- wait one turn for dog sled.

   s. Wild card -- covers anything, hold for emergency.

   t. Heavy smog -- all travel grounded until it lifts. Stay where you are.

   u. Windstorm blows dirt in your eyes. Bonus of 3 spaces to see your eye doctor.

   v. Carving initials on park trees outlawed by Smokey, go back 4 spaces.

   w. Good conservation department practices, go on free ride to the next area of the U. S.

   x. Picture taking, stay on in the exact spot.

VI. Debriefing.

A. The following questions may be appropriate:

1. Why did a certain player win?
2. What could help you win next time?
3. Which departments are the most difficult to recognize?
4. Which practices are similar or nearly alike?
5. Which practices are more useful in some areas than in another?
6. How does this game make you aware of the part that our government plays in conservation practices?

B. Test according to the behavioral objectives.

SPEC-CAT
(SPECIMENS AND CATEGORIES)

I. Overview.

This board game, to be used on a field trip, acquaints students with the characteristics of botanical specimens and with the categories to which these specimens belong. It was designed for ninth grade general science classes, but is easily adaptable to other grade levels. Teams of four students can play.

The same format can be used to teach the identification and classification of almost any available objects.

II. Objectives.

A. Behavioral.

Several botanical specimens are used to play this game and are listed, along with their classifications, on the included chart. The behavioral objectives as stated below pertain to these specimens only; however, it should be noted that they may be varied depending upon the participants and the occasion. Thus the specific objectives should be revised by the teacher to fit the game being played.

1. Given the following 25 specimens, the child should be able to identify any 15 of them by name:

Onion	Plantain	Moss	Arborvitae	Box Elder
Sourgrass	Wild Strawberry	Ferns	Yew	Oak
Grass	Clover	Toadstool	Blue Spruce	Maple
Timothy	Thistle	Algae	White Pine	Elm
Rye	Daisy	Liverworts	Juniper	Apple

2. Given a multiple choice test of 25 items including all specimens and of the following form:

(1) Algae: (Specimen)

(a) Monocots

(b) Thallophytes (Category)

(c) Angiosperms

the child should be able to answer 20 items correctly.

B. General.

After playing the game, the child should be able to observe that many small parts constitute the whole of nature.

MONOCOTS	DICOTS	THALLO-PHYTES	GYMNO-SPERMS	ANGIO-SPERMS
ONION	PLANTAIN	MOSS	ARBORVITAE	BOX ELDER
SOURGRASS	WILD STRAWBERRY	FERNS	YEW	OAK
GRASS	CLOVER	TOADSTOOL	BLUE SPRUCE	MAPLE
TIMOTHY	THISTLE	ALGAE	WHITE PINE	ELM
RYE	DAISY	LIVERWORTS	JUNIPER	APPLE

III. Materials and Game Components.

A. A defined geographic area.

B. A Bingo-type board or duplicated sheet for each player.
This board contains names of plant specimens that are to be found by players. The specimens are listed vertically under the categories to which they belong and are accompanied by a picture.
Specimens which are difficult to find should be placed as indicated below.
The board should be designed as follows:

Difficult				Difficult
	Difficult		Difficult	
		RARE		
	Difficult		Difficult	
Difficult				Difficult

names of categories

specimen names and pictures

A sample board is included.

C. Containers in which each team can place their collected plant specimens while on the field trip.

IV. Procedures.

A. Teacher must survey the given geographic area before the game is played in order to see what specimens are available; then he can establish the playing boards.

B. Teams of four (can be varied) are chosen; each player on a team receives a board.

C. Teams are sent with their boards into the defined area to select specimens; players on a team may either stay together or separate unless otherwise directed by the teacher.

D. After a time period specified by the teacher, teams return to the classroom and match specimens to the board examples.

E. Score is calculated.

V. Win Criteria.

The team with the highest score wins the game.

Scoring:

2 points - each block covered
10 points - each horizontal line
15 points - four corners
* 20 points - each vertical line
50 points - each diagonal line
50 points - center square
365 points - total for all squares covered

VI. Debriefing.

A. The following questions may be appropriate:

1. Ask the winning team why they think they won. Did they try to use strategy? (i.e., searching as individuals or staying together).

2. Ask the losing team why they think they lost (i.e., not being able to find the specimens, not having enough time, etc.). What would they do to improve their score on the next trip?

3. Ask questions regarding recognition of specimens. Example: How did you know that this is a fern?

4. Ask questions relating to the biosphere. Example: Where did you find the fern? What was near it? Was the area dry or moist?

5. Ask teams why they were unable to find certain specimens. The conclusion might be that the specimen was rare.

6. Ask what makes a specimen rare.

B. Test according to the behavioral objectives.

VII. Results of Tryout.